There are soldering pads on each end of the substrate for direct electrical wiring or for board to board connections. Soldering iron temperature should be between 650°F (340°C) and 750°F (400°C) to avoid damaging the LEDs.

**COLOR TEMPERATURE**

The four different sizes of the ZLP-multi are available in three shades of white:
- Cool White (8000°K)
- Neutral White (4100°K)
- Warm White (3200°K)

**SOLDERING**

There are soldering pads on each end of the substrate for direct electrical wiring or for board to board connections. Soldering iron temperature should be between 650°F (340°C) and 750°F (400°C) to avoid damaging the LEDs.

**CONNECTION TYPES**

There are two different ways to connect the ZLP Low Profile LED to a driver - the serial connection and the parallel connection. The maximum number of substrates that can be connected is three units, regardless of whether you attach them in series or parallel.

**SERIES CONNECTION**

*WITH ZLP-42-5XX*

Red: +  Black: -
Operational conditions: 10.2V 350mA

**PARALLEL CONNECTION**

*WITH ZLP-42-5XX*

Red: +  Black: -
Operational conditions: 3.4V 1050mA
LOW PROFILE LEDS

ASSEMBLY The ZLP Low Profile LED bars can be secured to a heat sink with M2 screws. To ensure optimal usage, it is essential to use all 4 or 6 screw mounting notches, depending on the model. Thermal grease or other thermally conductive material should be used between the LED substrate and the heatsink.

THERMAL DESIGN An effective thermal design relies on heat conduction and dissipation. The conduction path which heat travels is dependent on material properties, while dissipation depends on the surface area of the heat sink. It is important to provide a firm heat conduction path for the LEDs. One common method is applying thermal grease, which provides a direct thermal path from heat source to heat sink device. JKL can recommend several thermal grease vendors.

APPLICATION DRIVERS The ZLP Low Profile LED bars are current-driven and the current requirements of each individual product can be found on the specification sheet. Contact JKL for product and vendor suggestions for drivers.

CAUTIONS LEDs are electrostatic sensitive devices (ESD). Take appropriate precautions during handling and installation of the strips.

RECOMMENDED HEATSINK GUIDELINES

<table>
<thead>
<tr>
<th>Wattage</th>
<th>Surface Area</th>
<th>Fins Thickness</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Watt</td>
<td>30 - 40 cm²</td>
<td>&gt;1.5mm</td>
<td></td>
</tr>
<tr>
<td>2 Watt</td>
<td>40 - 50 cm²</td>
<td>&gt;1.5mm</td>
<td>&gt;2.5mm</td>
</tr>
<tr>
<td>3 Watt</td>
<td>50 - 90 cm²</td>
<td>&gt;1.5mm</td>
<td></td>
</tr>
</tbody>
</table>

RECOMMENDED THERMAL GREASE PARAMETERS

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Conductivity</td>
<td>&gt;3.0</td>
<td>W/mk</td>
</tr>
<tr>
<td>Thickness</td>
<td>≤0.1</td>
<td>mm</td>
</tr>
</tbody>
</table>